

Monte Carlo mini-App — Prerequisites



An MC transport application requires a variety of information, including:

- **A good random-number generator**
 - A parallel-capable random-number kernel will be needed that provides a predictable, independent random number sequence to an arbitrary number of processes. The method(s) used in MCNP6 will be recast as needed.
- **Initial conditions for a radiation source**
 - A user-defined external source (e.g., radiography)
 - An initial guess at an internal source (e.g., criticality)

5	10	15	20	25	30	35
4	9	14	19	24	29	34
3	8	13	18	23	28	33
2	7	12	17	22	27	32
1	6	11	16	21	26	31

- **A description of the transport “universe”**

- Cartesian, Cylindrical or Spherical axes specified as lists of intercepts

- **Compositional Information**

- The materials are separately defined and stored
- The isotopes will remain fixed during the calculation

- **Interaction cross-section data**

- Mean free path λ as a function of radiation type, energy, and material
- For creation of secondary packets, double-differential cross-section data may be required for some isotopes and reactions channels

$$\lambda(z, E) = \left[\sum_j (z, \rho(j) \times z, m(j).stp(E)) \right]^{-1}$$